

ATTACHMENT 1 - CONDITIONS OF APPROVAL

Volume 1 - Field Operations

General

As indicated in our comments on the draft, this volume is not complete without SOPs for sampling and analysis of bulk wastes, drums, structures, and equipment; and surveying and mapping of sampling points. These SOPs are still missing, and must be added before this volume can be approved.

The potential for confusion still exists among the various definitions provided for "potentially contaminated" vs. "not potentially contaminated" which must be eliminated. For example SOP 1.10, Section 6.0, lists and illustrates IHSS's and other specific areas considered contaminated and those surface water and sediment sampling stations "verified as background stations". It then states that "Unless specified in the individual project work plans, all other work areas will be considered potentially contaminated." Other SOPs in this volume (see 1.4) apparently consider all areas not specifically characterized as potentially contaminated to be not potentially contaminated. A comprehensive listing and/or a map must be prepared and included to show contractors, without question, where the "potentially contaminated" procedures specified are required.

SOP 1.1 - This SOP has evidently not been reviewed by or coordinated with the person(s) preparing the PPCD, as it contradicts current procedures as reflected in the interim PPCD. The SOP ends with dust measurements and Hi and Lo-Vol sampling; it and/or related Air SOPs (to be prepared) must specify what will be done with these samples, and establish the decision process for determining appropriate control measures based on the sample analysis results; coordination with the Final PPCD preparation will be essential, to ensure consistency.

SOP 1.5 - Examination of Sections 6.1 and 6.2 indicates purge and development water will be dumped on the ground unless field monitoring indicates contamination. This is not appropriate, as the field monitoring does not detect all compounds of concern. This (and related) SOP(s) must be changed to require that purge and development water originating in potentially contaminated areas be containerized and handled on the assumption that it is contaminated, regardless of field monitoring results. A full characterization of this material must be performed to identify and support proper ultimate disposal. Similarly, the SOP must require all equipment used in potentially contaminated areas be decontaminated according to SOP 1.3, not only when positive readings are obtained, as stated in section 7.0.

SOP 1.8 - Using the same logic as for purge and development water, all cuttings and drilling fluids derived from operations in potentially contaminated areas must be handled as if they are contaminated, regardless of field monitoring results, until a full waste characterization proves otherwise. This (and related) SOP(s) must be revised to reflect this requirement.

SOP 1.13 - The geotechnical SOP (3.2) indicates this is where we should find instructions for sub-sampling of cores, which we specifically noted as a missing item in our previous comments (on draft SOP 3.2, Section 5.3.1). The three items enumerated there [(1) the criteria and procedures used to select sampling intervals; (2) procedures for removal and preparation of sub-samples for extractable organics analysis, which should not be composited; and (3) provisions for taking VOA samples from other than the pre-targeted interval based on core examination and field testing] have not been added, and must be.

SOP 1.14 - This SOP includes the data forms submitted for database entry. However, it does not adequately indicate the need for air monitoring data forms. The section should include forms for air monitoring data.

SOP 1.15 - The Draft OU 2 Phase II (Bedrock) Work Plan references this and/or SOP 3.9 as the locations for procedures covering use of a portable GC as a site characterization tool. Very little such information is found in either SOP, as they deal predominantly with PID/FID use. During revisions, the SOPs and the associated SOPA must be expanded to provide a complete description of the equipment and procedures for portable GC use. This should include, but not be limited to: 1. Instrument(s), model and pertinent features such as isothermal oven; 2. Compounds for which standards will be prepared, and procedures for preparation or commercial sources; 3. Standard and conditional intervals for running machine and sampling train blanks; and 4. Procedures for preventing/purging contamination, particularly cross-contamination between consecutive samples.

Volume 2 - Ground Water

SOP 2.1, Section 5.1 - The section describes the calculation for ground water elevation in a monitoring well. It is generally confusing, and sometimes incorrect. For instance, it states the measuring point (MP) correction converts the measurement to a distance above or below land surface: the correction actually converts the measurement to a common reference point, such as mean sea level. The remainder of the SOP requires revision to eliminate inconsistent and confusing instructions and terminology, such as overlapping use of the terms "measuring point" and "reference point" within the text.

Volume 3 - Geotechnical

General

As indicated in our comments on the draft, this volume is not complete without SOPs for selection and use of geophysical techniques. Several of the work plans submitted and under development rely heavily on the use of both surface (GPR, EM, etc.) and down-hole (Gamma, neutron, etc.) techniques for site characterization. These techniques are by their nature prone to misuse and misinterpretation. Geophysical SOPs are still missing, and must be added before this volume can be considered complete.

While it is true that geological reconnaissance studies require considerable professional judgment and successful completion relies heavily on experience and insight; adherence to standardized methods can minimize errors and reduce the need for relogging. All field personnel must be consistent in following the same procedures for characterizing alluvial and bedrock materials. Also, training programs must be set up to educate and familiarize field personnel with the procedures presented or referenced in this volume.

Referring again to our comments on the draft, the SOPs still do not contain any mention of the "second hole" drilling technique, nor provide any procedure for drilling in high-hazard areas, both of which were previously promised. The SOPs must be revised, or new ones added, to cover these two issues.

SOP 3.1, Section 5.2 - Bedrock material is to be characterized using procedures and techniques described in the "Manual of field Geology" by Compton (1962). This SOP must describe in detail the procedures to be followed or the referenced document must be mandatory logging equipment in the field. This discussion must include a description of if and/or how a core reference set or similar tactic will be utilized to facilitate consistent lithologic descriptions. Also, some confusion exists on grain size scales. This SOP compares the different grain size scales, but does not state clearly which one is to be used; it must be revised to do so.

SOP 3.4, Section 7.0, Form 3.4A - The following technical information must be entered into the log:

- Core length
- Core loss
- Percent of recovery
- Core breakage due to discontinuities
- Total core breakage
- Rock classification and lithology

SOP 3.6, Section 5.3.2.1 - This section must state that protective casing will not be placed until the well passes plumbness and alignment tests, standards for which must be included here.

Volume 4.0 - Surface Water

SOP 4.8 - The pond sampling SOP must discuss provisions for sampling light or dense nonaqueous phase liquids (LNAPL or DNAPL) which may be present in surface water. Currently, the SOPs do not consider the possibility of LNAPLs or DNAPLs and the potential for LNAPLs or DNAPLs in ponds at Rocky Flats cannot be ignored. The previous comment on this subject was not addressed in the revised SOP.

Volume 5.0 - Ecology

General

The contents of this document are generally adequate and fully explanatory, although none discuss procedures for determining sample size, sample location, statistical procedures, or other considerations that will be left to the field sampling plan. EPA believes that in conjunction with the Environmental Evaluation Workplans to be prepared for each OU, the Ecology SOPs represent a workable field document. This is based on the assumption that field personnel would have appropriate knowledge and experience in conducting ecological studies in similar areas and conditions.

The SOPs are not consistent in the requirement of 40 hour health and safety training for field personnel, in compliance with 29 CFR 1910.120. Some SOPs state field personnel "should" have the training and some say field personnel "must" have the training. For work on RFP, this training must be required.

The SOPs do not discuss the possible existence of threatened, endangered, or other special status species on RFP and protocols to be implemented if any of these species are encountered. To be effective for field use, the SOPs must alert the field team members of the special nature of these organisms and the limitations on activities required to avoid harming them.

Volume 6 - Air

General

SOPs 6.1 through 6.7 cover EMADs stack-sampling procedures. These are not relevant to the ER program and do not belong here. SOPs 6.8 through 6.11 are apparently missing, as the next one provided is numbered 6.12. In short, the only relevant SOP we

have for air is for preventative maintenance of Hi-Vol samplers. A number of others need to be developed (in coordination with the Final PPCD) to complete this set. These must include but not be limited to:

- * Placement, design, installation, and operation of meteorological monitoring stations;
- * Placement, design, installation, and operation of particulate and air toxics monitoring stations;
- * Instrument calibration and maintenance;
- * Collection, handling, reduction, and reporting of meteorological and air quality data; and
- * Site-specific particulate and air toxic monitoring procedures at active investigation/sites.

QAPjP

Please reference our previous comments on the necessity to include pertinent sections of and/or provide the GRRASP. This has not been done, despite statements in the response to comments appended to this new QAPjP version, which assert variously that the GRRASP has been provided for review, will be provided, and has been incorporated in the SOPs. The information reportedly contained in the GRRASP is crucial to the final quality of the RI work. The QAPjP is incomplete, and cannot be considered approved, without inclusion of this material...

The frequency of collection for equipment rinsate blanks (noted in Section 3.3.5.1.2) must be modified to one equipment rinsate blank per 20 samples or once per day, whichever is more frequent. This frequency of collection was agreed upon between EPA, CDH, and EG&G during discussions on November 13, 1990. In addition, the field sampling SOPs should specify that volatile-free, American Society for Testing and Materials (ASTM) Type II reagent water be used for equipment rinsate blanks.

ATTACHMENT 2 - ADDITIONAL ITEMS FOR CONSIDERATION

SOP Volume 1

SOP 1.3, Section 5 - This section describes the methods used to decontaminate general field equipment. However, the revision does not adequately address the previous comment concerning general equipment decontamination. The discussion should include alternative decontamination methods for situations in which contaminants cannot be removed with detergent and water.

SOP 1.4 - Provisions should be made for steam cleaning in the field. Appropriate use of this decontamination method can greatly simplify and speed-up drilling operations by facilitating contaminant reduction at the drill site. It will prove far more effective than trying to wipe down heavy equipment with baby-wipes, as is currently proposed.

SOP 1.5 - Reference is made to "verified positive readings" in Section 6.2, but the meaning of this phrase is not quantified until SOP 1.8. The exact verification procedure appears overly conservative, and is not consistently described thereafter. These are presence-absence tests. A positive should be taken as such. There is no apparent need for a three-step verification.

SOP 1.8 - Flow charts similar to Figure 1.8-1 should be prepared to cover handling of all investigation-derived wastes and incorporated in the appropriate SOPs.

SOP 1.10 - The listing on Page 14 showing areas where liquids will be considered potentially contaminated should include "All areas characterized as potentially contaminated, regardless of field monitoring results" as an additional item.

SOP 1.16 - The discussion of the radiation detector readings believed to indicate contamination is of little use without the established background values requested in previous comments. This information should be added to the SOP.

SOP Volume 2

SOP 2.1 - Testing of well headspace with an OVA may give some indication of the presence or absence of LNAPLs; a procedure should be added for detection of DNAPLs, for which the headspace OVA test is of no value. In addition, the list of recorded data for each observation should include a space to note any concurrent activity that could impact water level measurements; please compare the current form with the draft SOP and the EPA

comments thereon for other missing items, including dates and weather conditions:

SOP 2.2 - Please see our previous comments on required purge volumes. The calculations provided do not include the volume of the saturated annulus. They should. Also, on page 7, the last item in the dot list does not make any sense. The steel tape is reported as accurate to the nearest 0.10 foot. The accuracy should be ± 0.01 -foot with overall accuracy ± 0.025 -foot. Please also note: OVD readings are described in SOP 1.15, not 1.5; the reference list of related SOPs is incomplete with respect to volume 1; and, some explanation is needed of what actions the Project Manager may or may not take upon notification that immiscible liquids are present.

SOP 2.4 - The surface reference point used to measure depth to water should be a notch on the north side of the casing lip, as described in SOP 2.1.

SOP 2.5 - The field parameters measured during ground water sampling events should include total alkalinity. Although not addressed in a previous comment, total alkalinity is an important geochemical parameter and should be measured during ground water sampling events.

SOP 2.6 - The rinsate collection method should be modified to include (1) complete decontamination for the equipment according to SOP 1.3, and (2) rinsing the decontaminated equipment with distilled water. Subsequently, the water from this final rinse is collected and submitted for analysis.

SOP Volume 3

SOP 3.1, Section 5.2.2.4 - Methods used for measuring and calculating porosity should be discussed and presented in this section.

SOP 3.1, Section 5.2.6 - A discussion of preferable cementing medium, as well as the cementing procedures (extent of weathering) should be included in this section. This would help to predict degree of friability of rocks.

SOP 3.1, Section 5.2.10 - Recording of fracture density can be important in analyzing the local structure.

SOP 3.1, Section 6.2 - The drill interval and core box number (i.e. box 1 of 5) must also be recorded on the core boxes.

SOP 3.1, Section 6.3.2 - Definition of safe (contamination level) is necessary. If samples are collected from the core, SOP 3.2 detailing the sampling procedures must be referenced.

SOP 3.2, form 3.2A - Also noted on the form must be any decontamination of equipment and sample collection for QA/QC.

SOP 3.3, Section 5.1.2 - Methods to verify grout requirements have been met should be discussed in this section.

SOP 3.4, Section 5.3.2 - In the discussion of rotary drilling techniques (with air and water) note that these methods can affect the moisture content of subsequent core/cuttings and other hydrogeologic measurements (for example, wet bulk density and permeability). Also, volatilization of contaminants can occur because of air turbulence and water injection can change in-situ water quality; use of these techniques is thus not recommended except where absolutely necessary.

SOP 3.6, Section 5.3.2 - General considerations for well installations should be presented in this SOP. Some of these considerations are listed below:

Water table wells should have screens of sufficient length and thickness to monitor the water table and provide sufficient sample volume during high and low water table conditions.

Wells with low recharge should have screens of sufficient length and width to allow for adequate sample volume collection.

Wells should be screened over short distances to allow discrete intervals of contamination to be monitored.

Where immiscible liquids or contamination in the upper portion of a hydraulic unit are being monitored, the screen should be set so the upper portion of the water bearing zone is below the top of the screen.

Where dense immiscible fractions are being monitored, screen should be set within the lower portion of the water bearing zone, just above a relatively impermeable lithologic unit.

The screen interval should not extend across more than one hydraulically distinct saturated zone.

If contamination is known to be present and concentrated within a discrete interval of the saturated zone, the screen should be placed in a manner that minimizes the potential for cross contamination with other intervals.

SOP 3.7, Section 5.2.2 - Pits and trenches will need to be mapped where such geologic information is necessary. Photo-documentation of configuration and contents is recommended.

SOP 3.8, Section 6.0 - Sampling with other hand implements (Augers, hollow tubes) needs to be included in here.

SOP 3.9 - Analysis of in-situ soil gas by Portable or field-mobile GC is the preferred, and most commonly used method. Use of PID/FIDs, on which this SOP concentrates almost exclusively, is of extremely limited utility. Use of a field GC in site characterization is not a simple process, as the one-paragraph treatment of it here would suggest. A separate, and complete, SOP for field GC use should be prepared.

SOP Volume 4

SOP 4.2 - The SOP should include a discussion of the potential problems and solutions associated with ionic strength errors when measuring field pH so the operator can be aware of potential problems and solutions when performing the field tests. The SOP should also include a discussion of the potential problems and solutions associated with large changes in the cell constant determination during conductivity measurements so the user can be aware of potential problems when performing field tests. Previous comments on these issues have only been partially addressed.

SOP 4.5 - From the way it is described here, it appears the base laboratory supports all the field activities. As such, this SOP should be expanded and relocated to Volume 1.

SOP Volume 5

SOP 5.1 - The text states that the sampling apparatus may be lost "due to the flashy nature" of Rocky Flats streams. The meaning of "flashy nature" is not clear. This term should be clarified.

SOP 5.2 - The list identified 37 percent formalin as the preservative to be used. This concentration is considerably higher than necessary to adequately preserve benthic samples and may irritate the eyes and respiratory system of the individual who will process the samples. A concentration of 10 percent formalin is adequate to preserve benthic samples.

The text states that a Surber or Hess sampler may be used for stream sampling. If both are available, the Hess sampler should be chosen over the Surber because of problems associated with side flow around a Surber sampler.

SOP 5.3, Section 7.2 - Form 5.0B needs to include filtration efficiency.

SOP 5.4 - The text states that fish weight will be determined by

water displacement. It is not clear why this method will be used rather than weighing with scales. It is suggested that the method be revised to use the more standard field procedures of weighing with scales. If a water displacement method is kept as a weight determination procedure, it should be described.

SOP 5.5 - The text discusses relative abundance surveys using transects. Changes in habitat will be recorded as a transect crosses habitat boundary and observations associated with the transects will be noted. Binoculars or spotting scopes will be used to identify distant organisms. The methods are not described to ensure that all observations of distant organisms from a given habitat will be identified as belonging to the appropriate habitat. More information should be provided on the processes to be used.

This SOP contains a standard methodology for community surveys of large mammals, but does not present the appropriate protocols for their collection. These protocols must be incorporated into this SOP, since tissue or specific organ analysis are needed to determine contamination levels on these particular receptors.

SOP 5.6 - The text indicates that a grid of 100 traps in 10 rows of 10 traps each at 5 meter (m) intervals will cover an area of 50 m by 50 m, or 2500 square meters. In reality, the grid will cover a 45 m by 45 m area. Similar comments are related to the smaller grids to consist of 25 traps and linear trap lines (described on page 8). The text or sampling plan should be revised to recognize the actual sampling area.

SOP 5.7 - The procedures to be used are not clear and appear to conflict with each other. The bullets should be rewritten and perhaps combined to eliminate confusion.

SOP 5.8 - Information pertaining to protocols for capturing and collection of reptiles and amphibians appeared to be missing. This SOP must incorporate such procedures, since individual analyses may be needed for these species.

QAPjP

The problem of information getting lost during cross referencing from the QAPjP to SOPs has not been entirely resolved. An example is information such as quantitative or qualitative data acceptance criteria, procedures for collecting rinsate blanks, and measures specified to maintain QA/QC of sampling procedures during field activities. Neither the QAPjP nor the SOPs includes complete information on these topics. QA/QC procedures are generic and should be included in their entirety in one document. Related documents could then refer to

a single source, reducing the risk of losing information. EPA prefers that a complete set of information on QA/QC be included in the QAPjP rather than in the SOPs.

The procedures for collecting field duplicate samples should be described or appropriately referenced. Section 3.3.5.1.1 notes field duplicates may be obtained from soil, water, or air samples; lists the SOPs for various field sampling procedures; and states that the cited SOPs contain the procedures for collecting field duplicates. However, the list of SOPs is not complete (SOPs 3.2, 3.7, 6.1, and 6.3 should be added). In addition, some of the field sampling SOPs do not contain procedures for collection of field duplicate samples (see SOPs 3.2, 3.7, and 3.8).

The discussion of trip blanks in Section 3.3.5.1.3 should be expanded. Several inconsistencies are present in Section 3.3.5.1.3, as follows:

- a) The distinction between "field" blanks and "trip" blanks should be clarified. Field blank contamination is used as a criterion for initiating the use of trip blanks, but the procedure for collecting a field blank is not discussed. Field blanks are mentioned briefly in the field sampling SOPs, but detailed collection procedures and collection frequency are not presented. (In the SOPs, field blanks are described as "... containers filled with distilled or deionized water that are handled and transported the same as the other samples")
- b) The procedure for the preparation of trip blanks should be clarified. Section 3.3.5.1.3 lists three different references for the preparation of trip blanks: (1) individual site QAAs, (2) field sampling SOPs, and (3) text of the second paragraph of page 3-16. The field sampling SOPs do not contain descriptions of trip blank preparation. Site QAAs were not available for review.
- c) The rationale for not using trip blanks should be more fully supported. The selection of three occurrences of contamination in 1 month as the criterion for initiating trip blank usage should be explained. Elimination of trip blanks may increase the difficulty in determining the source of contamination.
- d) The need for trip blanks (or field blanks) in conjunction with soil and sediment sampling should not be neglected. The need to assess the contamination of sample containers during storage and transport is also important for soil and sediment samples. If commercially available solid materials are not available to serve as blanks, ASTM Type II reagent water should be substituted as the blank matrix.

Section 2.3 - Air SOPs should be included in Table 2.1.

Section 3.3.1 - The broad descriptions of Data Quality Objectives (DQOs) should not limit the concept to quality of measurement data alone, but should encourage the use of DQOs in design of all aspects of investigations (e.g. methods for sampling, sample preparation, and analysis, etc.).

Section 3.3.2 - Approved SOPs won't be identified in the SAP, they are part of the SAP, of which this QAPjP is the other part. This section must explain what measures will be employed to maintain QA/QC of sampling procedures during field activities. Particular attention must be paid to devising methods to maintain QA/QC when numerous field crews from several consulting firms will be performing the same sampling procedures in different OUs.

Section 3.3.3 - All references cited in this section should be included in the reference section (Appendix C).

Section 3.3.4.2 - Part of the provisions for field data "validation" should include the need for appropriate replication of field samples.

Figures 8.1 and 8.2, pages 5 and 6 - These diagrams are not legible. Letters are too small, and consequently, diagrams are hard to follow.

Section 10.3.2 - Controlling SOPs containing information on inspection holding points should be referenced.